Spot Reduction:
Why It Doesn't Work
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SCIENCE TO THE RESCUE

Spot reduction is the idea that exercising a specific body part, such as the abdominals, causes the involved muscles to use the surrounding fat for energy. This belief is the reason high repetition sit-ups, side bends, leg raises, and twisting movements have been practiced for years as a way to remove fat from the waist.

Furthermore, spot reduction includes the use of passive machines such as vibrating belts, mechanical rollers, and suction devices, as well as rolling pins, gloves, and various massage techniques.

Spot reduction may seem doable to a lot of people. But science proves otherwise.

The fat that is stored around your waist and throughout your body is in a form known as lipids. To be used as energy, the lipids must first be converted to fatty acids. This is a complex chemical procedure. To be used as fuel, the lipids travel through the blood stream to your liver. In your liver they are converted to fatty acids, which are then transported to your working muscles.

It would be convenient if the fat cells selected were from areas where you have the thickest layers. But there are no direct pathways that exist from your fat cells to your muscle cells. When fat is used for energy, it is mobilized primarily through your liver from fat cells all over your body. The selection process your body uses for mobilizing its fat stores is genetically programmed. The mobilization process, in fact, operates in reverse order from which you store fat. The last places you store fat are usually the first from which you lose it.

FAVORITE FAT-STORAGE SPOTS

Most of the fat that an average person has is located between the skin and muscle all over the body. Thin layers are around the feet, hands, and face. The layers thicken toward the body's core. The upper arms and thighs, for example, have thicker layers than do the forearms and calves. The thickest layers of fat for a man are located on the waist, usually around the navel and over the sides between the lower ribs and the pelvic girdle. A woman sometimes stores fat there, too, but usually her thickest layers are over the buttocks and upper thighs.

A typical man might deposit fat first on the sides of his waist. Second, it might go over the navel area; then the hips and chest; then the upper arms and thighs; and finally the calves, forearms, hands, feet, and face. When he reduces fat, it comes off in reverse: first from the face, feet, hands, forearms, and calves; then the thighs and upper arms, followed by the chest and hips; and finally the navel area and sides. Once again, the ordering above is typical.

And as you probably know, some men are not average — they were born with an advantage. These men may lose fat first or second from their waist. Rather than be a huge struggle, as it is for most of us, their waistline fat comes off moderately easy.

A few women fall into this moderately easy category, too. They can get it off their hips and thighs quickly. But more typical, most women have to become almost emaciated in their upper bodies to finally start to mobilize fat from their hips and upper thighs.

But why? Why would nature make the fat storage spots around our body's core so difficult to remove?

The answer is a long, or perhaps a short, story — depending on how you look at the history of humans. A brief time line will help to explain my point.

HUMAN HISTORY AND FATNESS

Based on our present state of scientific knowledge, the major events and appearances in this story would include:

200,000,000 years ago: the first mammals

4,000,000 years ago: the first bipedal hominids

2,400,000 years ago: the first stone tools

400,000 years ago: early archaic Homo sapiens

100,000 years ago: anatomically modern humans

15,000 years ago: the first humans in Americas

12,000 years ago: end of last Ice Age

9,000 years ago: the first farmers

6,000 years ago: the first cities, writing, and civilization

200 years ago: the Industrial Revolution

100 years ago: first signs of some obesity in USA

20 years ago: 50% of adults overweight in USA

3 years ago: 74% of adults overweight in USA

An interesting situation emerges from the above time progressions. Before I explain, permit me to digress just a little.

A couple of months ago, I needed some dramatic artwork for my home. I had a couple of great pictures from a friend in Gainesville that showed the Hale-Bopp comet and a close-up of the moon. I wanted to get another four or five similar pictures. So, I went on the Internet to see what I could find.

I located a couple of websites (see **www.spaceimages.com** and www.nasa.gov/gallery) that centered around deep space, most of which photography was taken with the Hubbell Telescope. Anyway, as I progressed into some of the government-funded projects, I was simply blown away by the deep-space pictures of our known universe — and the fact that large prints can be ordered at very reasonable prices.

Today, these extraordinary pictures cover a wall in my vaulted ceiling, family room.

For 30 years, I've been interested in our planet, the other planets, our solar system, and the chemistry and physics of the inter-relationships between humans, environment, and space.

When you study the time frame above — from the first mammals to today — you recognize that 200,000,000 years is but a blink in the total time frame of our universe. By the best calculations, our solar system — which includes our Earth and eight other planets orbiting the sun — formed some 4,500,000,000 years ago. It took 500,000,000 years for the first complex organic molecules to develop on our Earth. And another 3,800,000,000 transpired before the first mammals finally evolved.

Evolution requires a lot of things going on simultaneously. But most of all, it takes time — large, almost incomprehensible amounts of time.

Now, let's go back to the time listings and see if we can bring this discussion to a close.

ANCESTORS AND FATNESS

Our ancestors, the ones that were recognizably human in looks, first appeared 100,000 years ago. Life then was no only hard but brief. Lucky was the man or woman who made it to 21 years of age.

Since freezing-cold temperatures were the norm for most of the year, due to prevalent Ice Ages, any fat on the body was a tremendous advantage. I dare say, however, that there wasn't a single case of obesity for some 90,000 years. Not until the last Ice Age subsided.

Once the climate started to warm, and farming began to emerge (9,000 years ago), then perhaps for the first time ever, our human ancestors — at least, a small percentage of them — had access to enough calories consistently to become somewhat obese. In fact, they — especially the woman — were probably greatly admired and sought after.

Gradually, over many generations, the individuals who could store the most calories quickly and efficiently lived the longest and reproduced the most.

Still, I suspect you hardly ever — even if you traveled your entire life — saw a severely obese individual. Severe obesity probably first was identified some 6,000 years ago in the primary pockets of civilization, which were also the population hubs. Two-thousand-years ago, some of the emperors of Rome, and elsewhere, were depicted as being rather obese.

Only after the Industrial Revolution was well established throughout the civilized world (early in the 19th Century) did overweight individuals cease being rare. Then, over several generations, as people began to live longer and reproduce more often, overfatness became more and more prevalent during the first half of the 20th Century.

Finally, in 1995, the United States was unofficially declared "The Fattest Nation on Earth," moving ahead of the Russians and Germans.

WHY ARE WE SO FAT?

Why has the United States become the fattest nation on Earth? The simplistic answer is . . . we have the most plentiful and most accessible food supply, combined with the fact that our leisure-time activities increasingly revolve around television, movies, computers, and other passive activities.

A more complex answer involves genetics. Over the last 9,000 years, our ancestors became increasing more efficient and effective storers of fat. Finally, here we are — people living at the beginning of the 21st Century — and we're the fattest people that have ever lived!

But we also have the capacity to be the smartest people who have ever lived. At least, we have access to information that provides us with that potential. To become smarter, we must understand and act.

FIVE POINTS TO UNDERSTAND

• First, understand that we store fat in disproportionate amounts around the middle of our bodies. Why? Because it had to be that way. It wouldn't have worked storing it on our hands, feet, heads, and other extremities. It would have been too awkward to move; thus, it wouldn't have evolved.

• Second, understand that fat surrounding the body's core in moderate amounts was good. It provided warmth, protection, and a long-term source of energy. With women, it contributed to the entire child-birth process, as well as the baby's sustenance.

• Third, understand that the concept of spot reduction of core body fat, or any other storage sites, is *not* based on science. Not with general exercise, not with specific exercise, not with vibrating belts or with other passive devices. Remember there's no direct link between the underlying muscle and the overlying fat. Our genetics were not established with spot reduction as a priority.

• Fourth, understand that for spot reduction of fat to become normal, it would take a modification of our genetics . . . which is possible, but not probable. Yes, we can still evolve. However, it would require time, perhaps several thousand years — which translates 90 to 100 generations. Hey, a lot of good that does us, right?

• Fifth, understand that only in the last 50 years has science determined that too much body fat is actually detrimental to health and well being. And only in the last 20 years has a super-lean look, with rippling abdominals, become so important to fitness-minded people.

APPLY SCIENCE

Finally, let me say that — yes, there appear to be a few people who can spot reduce. But the truth is that they simply have different orderings of storing and losing fat than do the vast majority of the population. They lose fat from their body cores first or second, rather than the more typical last or next-to last.

These people have very rare and exceptional genetics.
So, forget spot reduction. Say hello to *discipline* and *patience* and the *scientific side* of fat loss.